WHAT IS CLAIMED IS:

1.   An image processing apparatus for executing a smoothing process of image data, comprising:

extraction means for extracting a pixel of
5   interest and surrounding pixels thereof from input image data;

first average value calculation means for calculating an average value of the pixels extracted by said extraction means;
10   separation means for separating the pixels extracted by said extraction means into two categories using the average value calculated by said first average value calculation means;

second average value calculation means for
15   calculating average pixel values of the two categories; and

output means for outputting a value, which is approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories
20   calculated by said second average value calculation means.

2.   An image processing apparatus for executing a smoothing process of image data, comprising:

extraction means for extracting a pixel of
25   interest and surrounding pixels thereof from input image data;

first average value calculation means for calculating an average value of the pixels extracted by said extraction means;

separation means for separating the pixels
5 extracted by said extraction means into two categories using the average value calculated by said first average value calculation means;

second average value calculation means for calculating average pixel values of the two categories;
10 determination means for determining whether or not the pixel of interest belongs to a flat region; and

output means for, when said determination means determines that the pixel of interest belongs to a flat region, outputting the average value calculated by said
15 first average value calculation means as smoothed data, and for, when said determination means determines that the pixel of interest does not belong to a flat region, outputting a value, which is approximate to a pixel value of the pixel of interest, of the average pixel
20 values of the two categories calculated by said second average value calculation means.

3. An image processing apparatus for executing a smoothing process of image data, comprising:

image reduction means for reducing an input
25 image;

extraction means for extracting a pixel of interest and surrounding pixels thereof from the image reduced by said image reduction means;

first average value calculation means for

5   calculating an average value of the pixels extracted by said extraction means;

separation means for separating the pixels extracted by said extraction means into two categories using the average value calculated by said first

10   average value calculation means;

second average value calculation means for calculating average pixel values of the two categories; and

output means for outputting a value, which is

15   approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories calculated by said second average value calculation means.

4.   An image processing apparatus for executing a

20   smoothing process of image data, comprising:

image reduction means for reducing an input image;

extraction means for extracting a pixel of interest and surrounding pixels thereof from the image

25   reduced by said image reduction means;

first average value calculation means for calculating an average value of the pixels extracted by said extraction means;

separation means for separating the pixels

5   extracted by said extraction means into two categories using the average value calculated by said first average value calculation means;

second average value calculation means for calculating average pixel values of the two categories;

10   determination means for determining whether or not the pixel of interest belongs to a flat region; and

output means for, when said determination means determines that the pixel of interest belongs to a flat region, outputting the average value calculated by said

15   first average value calculation means as smoothed data, and for, when said determination means determines that the pixel of interest does not belong to a flat region, outputting a value, which is approximate to a pixel value of the pixel of interest, of the average pixel

20   values of the two categories calculated by said second average value calculation means.

5.   The apparatus according to claim 1, further comprising:

selection means for selecting one of the value

25   output by said output means and the pixel value of the pixel of interest in accordance with a difference value

between the value output by said output means and the

pixel value of the pixel of interest.

6.   An image processing method for executing a

smoothing process of image data, comprising the steps

5   of:

(a) extracting a pixel of interest and

surrounding pixels thereof from input image data;

(b) calculating an average value of the pixels

extracted in the step (a);

10   (c) separating the pixels extracted in the step

(a) into two categories using the average value

calculated in the step (b);

(d) calculating average pixel values of the two

categories; and

15   (e) outputting a value, which is approximate to

a pixel value of the pixel of interest, of the average

pixel values of the two categories calculated in the

step (d).

7.   An image processing method for executing a

20   smoothing process of image data, comprising the steps

of:

(a) extracting a pixel of interest and

surrounding pixels thereof from input image data;

(b) calculating an average value of the pixels

25   extracted in the step (a);

(c) separating the pixels extracted in the step
(a) into two categories using the average value
calculated in the step (b);

(d) calculating average pixel values of the two
5   categories;

(e) determining whether or not the pixel of
interest belongs to a flat region; and

(f) outputting, when it is determined in the
step (e) that the pixel of interest belongs to a flat
10   region, the average value calculated in the step (b) as
smoothed data, and outputting, when it is determined in
the step (e) that the pixel of interest does not belong
to a flat region, a value, which is approximate to a
pixel value of the pixel of interest, of the average
15   pixel values of the two categories calculated in the
step (d).

8.   An image processing method for executing a
smoothing process of image data, comprising the steps
of:

20   (a) reducing an input image;

(b) extracting a pixel of interest and
surrounding pixels thereof from the image reduced in
the step (a);

(c) calculating an average value of the pixels
25   extracted in the step (b);

(d)   separating the pixels extracted in the step

(b) into two categories using the average value

calculated in the step (c);

(e)   calculating average pixel values of the two

5   categories; and

(f)   outputting a value, which is approximate to

a pixel value of the pixel of interest, of the average

pixel values of the two categories calculated in the

step (e).

10   9.   An image processing method for executing a

smoothing process of image data, comprising:

(a)   reducing an input image;

(b)   extracting a pixel of interest and

surrounding pixels thereof from the image reduced in

15   the step (a);

(c)   calculating an average value of the pixels

extracted in the step (b);

(d)   separating the pixels extracted in the step

(b) into two categories using the average value

20   calculated in the step (c);

(e)   calculating average pixel values of the two

categories;

(f)   determining whether or not the pixel of

interest belongs to a flat region; and

25   (g)   outputting, when it is determined in the

step (f) that the pixel of interest belongs to a flat

region, the average value calculated in the step (c) as

smoothed data, and outputting, when it is determined in the step (f) that the pixel of interest does not belong to a flat region, a value, which is approximate to a pixel value of the pixel of interest, of the average

5 pixel values of the two categories calculated in the step (e).

10. The method according to claim 6, further comprising the step of:

(f) selecting one of the value output in the

10 step (e) and the pixel value of the pixel of interest in accordance with a difference value between the value output in the step (e) and the pixel value of the pixel of interest.

11. Computer executable program code for executing a

15 smoothing process of image data, the code comprising:

an extraction step of extracting a pixel of interest and surrounding pixels thereof from input image data;

a first average value calculation step of

20 calculating an average value of the pixels extracted in the extraction step;

a separation step of separating the pixels extracted in the extraction step into two categories using the average value calculated in the first average

25 value calculation step;

a second average value calculation step of calculating average pixel values of the two categories; and

an output step of outputting a value, which is
5   approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories calculated in the second average value calculation step.

12.   A computer-readable medium having computer-executable program code for executing a
10   smoothing process of image data, the code comprising:

an extraction step of extracting a pixel of interest and surrounding pixels thereof from input image data;

a first average value calculation step of
15   calculating an average value of the pixels extracted in the extraction step;

a separation step of separating the pixels extracted in the extraction step into two categories using the average value calculated in the first average
20   value calculation step;

a second average value calculation step of calculating average pixel values of the two categories; and

an output step of outputting a value, which is
25   approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories calculated in the second average value calculation step.